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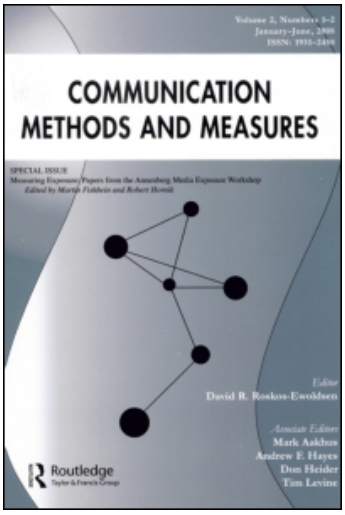
Klimmt, C.; Vorderer, P.A.; Ritterfeld, U.

published in
Communication Methods and Measures
2007

DOI (link to publisher)
10.1080/19312450701434961

document version
Publisher's PDF, also known as Version of record



Communication Methods and Measures
Publication details, including instructions for authors and subscription information:
http://www.informaworld.com/smpp/title~content=t775653633

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To cite this Article Klimmt, Christoph , Vorderer, Peter and Ritterfeld, Ute(2007) 'Interactivity and Generalizability: New Media, New Challenges', Communication Methods and Measures, 1: 3, 169 — 179
To link to this Article: DOI: 10.1080/19312450701434961
URL: http://dx.doi.org/10.1080/19312450701434961

COMMUNICATION METHODS AND MEASURES, *1*(3), 169–179

Interactivity and Generalizability: New Media, New Challenges

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This paper discusses potential challenges to research generalizability in studies on interactive communication. In interactive media contexts where users are enabled to individualize their communication, the generalizability of individual studies is likely lower than it is in studies on more conventional one-to-many communication. We discuss research strategies related to sample size and heterogeneity, focus on structural-invariant elements of communication media and processes, and finally refer to the recording and analyses of messages and communication processes as potential remedies to generalizability problems. A more explicit reflection on generalizability both in empirical studies as well as in the way the discipline deals with replication of previous work seems to be necessary.

INTRODUCTION

Interactivity is the label for a group of significant developments in mass communication technology and media use (Rafaeli, 1988; Steuer, 1992; Vorderer, 2000). The advent of interactive media technologies marks a fundamental shift away from the invariance of traditional mass media messages (Rafaeli, 1988; Steuer, 1992). Media users now have much influence on the properties of the message they are exposed to, which leads to more or less individualized media usage. Consequently, Klimmt and Vorderer (2006, p. 417) define interactive media as

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communication applications that "allow users to manipulate the content and form of communication (within certain limitations) and/or to participate actively in using the media product." In this sense, interactive media differ from conventional so-called linear media that do not allow user influence on message form and content (e.g., television). A broad variety of manifestations of interactivity has evolved, including Internet media such as the Web, e-mail, blogs, or chats, as well as digital entertainment media such as video games. In this paper, we briefly introduce some challenges to research generalizability that occur in many different manifestations of interactive media. We then propose some methodological strategies to resolve these difficulties and conclude with a reflection on generalizability being in need of a more explicit discussion in much of contemporary communication science.

GENERALIZABILITY ISSUES IN INTERACTIVE COMMUNICATION

Extreme Selectivity

While selective exposure to communication has been acknowledged as an important aspect of non-interactive (mass) communication settings (Zillmann & Bryant, 1985), interactive media differ from such mass communication settings as they typically enable many more degrees of freedom in communication choices. Users of the World Wide Web (WWW) have access to enormous numbers of web pages, each of which represents a mass communication message of its own. As a consequence, the study of interactive communication faces the challenge that any scientifically observed selective exposure behavior is only a small fraction of the interactive-selective behaviors that are enabled by highly interactive media and that can be expected to occur in reality. Thus, *in a given study* the ratio of *selection behaviors observed to total possible selection behaviors* is expectably much smaller in interactive media settings than it is in mass communication settings (e.g., a newspaper with a limited number of articles or a TV setting with a finite number of available channels).

The extreme selectivity that interactive media use typically implies also refers to the presence of many more decision points where selection occurs. For instance, digital music systems allow listeners to compile unique and extremely heterogeneous sequences of music from large-scale file repositories. Thus, a study of selective exposure to music and its consequences for listeners' emotional states (Knobloch & Zillmann, 2002) must somehow capture the unique nature of each listener's listening history. Because interactive media's capacity to enable extreme, multistep selective behavior, a single empirical study can only detect a very small set of patterns from the vast number of patterns available.

Thus, a standard-size investigation can only claim modest levels of generalizability in terms of how well the observed patterns of communication represent the universe of real patterns outside of the study.

Co-creation

Various interactive media offer more than mere options to select from, but rather invite users to actually create part of the content provided by the medium. One example is video game software that invites users to use its "construction tools" to build extensions, variations, or other kinds of modifications, which may lead to and result in completely new games that have nothing to do with the original game upon which it was built (Sotamaa, 2005). Other forms of such collaborations between communicators and users are customized web pages for personal representation that are built with tools provided by Internet platforms such as *myspace.com* (Doering, 2002). Co-creative interactive media use alters the sender-receiver constellation that was more or less fixed in traditional mass communication settings, as media users now actively contribute to form and content of messages and communication products.

In terms of generalizability, co-creation is a severe challenge, because it (a) increases the ways of exposure to and influence on media messages exponentially and (b) makes the structural properties of conventional communication processes such as fixed message content, pre-defined sender-receiver-constellations, or the requirement of linear sequencing of messages vanish. With such structural dynamics, Shapiro's (2002) call to improve generalizability by focusing on the "underlying principles" (p. 494) rather than the surface properties of social communication is much more difficult to follow in interactive media research, as precisely the structural features and underlying principles are more flexible, variable, and heterogeneous than they are in mass communication settings.

Individual Message (Co-)Construction

Some interactive media invite or even demand their users produce the content circulated among the audience. In this case, users are not co-creators (i.e., working collaboratively with the originators of the medium) but rather are completely autonomous authors or senders. Socially relevant examples of this are massively multiplayer online games (MMOGs: Chan & Vorderer, 2006) and other social-virtual environments, e.g., *Second Life*, in which users establish individual elements such as unique avatars, buildings, information campaigns, or mini-games. The role change from receiver to sender that was mentioned above is even more visible here when it comes to users producing messages or parts of messages within interactive media environments autonomously. Complexity is further increased if interactive media enable collaborative message construction

(co-construction), that is, mediated communities (Wise, Hamman, & Thorson, 2006) producing communication together such as guilds in Massively Multiplayer Games (Steinkuehler, 2006). Applying theories of interpersonal communication to such interactive media use (Konijn, Tanis, Utz, & Linden, in press) is a most fruitful strategy, but individual message construction still implies substantial challenges to research generalizability: The possibility of message (co)-construction in interactive media use can create an infinite number of empirical realizations of communication phenomena that may be hard to pin down in terms of fundamental principles that can be generalized across online communities or other social-interactive environments. For example, studying the specific ways of how the technological boundaries of multiplayer video games affect communication phenomena among players may be difficult if one tries to generalize findings from one such game environment to other games, because of the infinite numbers of player-player and player-system interactions that can affect communication (see also Pena & Hancock, 2006, p. 106, for similar considerations).

Moreover, interactivity alters the structural setting of communication situations in terms of its sender and receiver roles. Because with interactive media users have much more influence on the communication setting, contents, and/or process, individual differences such as general capabilities (e.g., speed of information processing; see Vorderer, Knobloch, & Schramm, 2001) and media-specific skills (in task-oriented communication settings, such as video games; Skalski, Bracken, & Tamborini, 2005) affect communication, which generates a new source of variance to be addressed in empirical inquiries. On an abstract level, one could argue that interactivity expands the relevance of "person x situation x content" interactions, which determine the process, quality, and outcomes of mediated communications and thereby increases theoretical and empirical complexity.

As a consequence, research programs on interactive communication face substantial challenges to the generalizability of their claims. Each individual empirical investigation, be it a survey study, online experiment, or qualitative interviews with users of interactive media within such programs, faces the same challenges. This is because the structural equality between the communication phenomena investigated within the study and the universe of addressed communication phenomena in reality is more difficult to argue when mediated communication is interactive: Interactivity affects exactly the structural properties of content, content production, and message reception that could be taken as foundation for generalizability in non-interactive communication settings. We therefore turn to discussing possible research strategies to address generalizability problems in the next section. It is implied that improvement strategies on the level of single studies will also help to achieve better generalizability at the level of research programs or the discipline at large, where generalizability is an even more important issue (Shapiro, 2002, p. 496).

METHODOLOGICAL STRATEGIES

Several techniques and strategies seem to be possible and appropriate: the increase of sample size and heterogeneity; a focus on structural, invariant message properties; and a recording and exploratory analysis of empirically realized communication patterns.

Sampling Strategies

The conceptually easiest remedy for generalizability problems seems to be to observe more cases. If interactive communication behavior is more dynamic and complex than linear communication, more media users, more online conversations, more blog protocols, more video game sessions, etc., need to be investigated in order to "catch" more of the many conceivable manifestations and realizations of interactive communication.

In addition to higher case numbers, more heterogeneous samples should be useful in order to keep track of interactive communication behaviors: If individual variables are much more relevant in interactive communication, then variation of such individual differences is a desirable response to this problem (e.g., by expanding experimental samples beyond the traditional student populations). Sample heterogeneity may, however, not only refer to people. In which respect a sample should be "heterogenized" certainly depends on the research issue. However, it is not the optimal strategy to increase sample heterogeneity to the highest extent possible (Calder, Phillips & Tybout, 1983; Cook & Campbell, 1979). Rather, it would be more informative and efficient to think about the variables that could produce heterogeneity (e.g., computer skills, day time of communication, Internet bandwidth) in terms of which values of these variables should theoretically be expected to make a difference to the underlying principles of communication in which researchers are interested. Such a priori considerations may help to define properties of the desired sample in terms of a limited level of heterogeneity and lead to more "generalizable" results than sampling as many different people, situations, devices, and so on.

As an example, consider a laboratory experiment to test the hypothesis that better performance in a game predicts game enjoyment. To manipulate (the probability of good or bad) performance of participants, the researchers create a hard and an easy version of the same game, "Tetris." The number of points collected by players serves as a manipulation check, and post-play self-report items produce data on game enjoyment. Volunteer participants will be mostly hardcore gamers with high-level gaming experience and the desire to demonstrate their skill. Aside from validity issues of the research design, it is plausible to assume that the way people interact with Tetris and their experience with gameplay will be highly diverse, so a heterogeneous sampling strategy that also includes

non-experts is indicated. Instead of collecting as many cases as possible, theory derived from the psychology of motivation may help to identify populations that would theoretically be most useful for sampling. Generalizability of the study's results would then be improved if players are sampled who assign high versus low personal relevance to winning (*success motivation*) and/or who hold different *aspiration levels* concerning video game performance (Heckhausen, 1991). This way, sample heterogeneity would not be random, but theory-driven.

Even with such theory-based sample planning, implementing such potentially larger and more heterogeneous samples implies a substantial increase of economic resources invested into a given study (e.g., more compensation for participation, more effort to find participants outside of a university campus, more working hours for content analysis). Given the limitations of economic resources for scientific inquiry and the fact that studies on interactive media are more expensive (e.g., more sophisticated machinery required, experimental sessions must be run individually and not in groups of participants), the practicability of this strategy may be rather low for most research projects and teams.

Focus on Invariant Elements in Interactive Communication

Another strategic direction for improving generalizability in empirical studies on interactive communication is to think more carefully about which of interactive media's properties are susceptible to the uncontrolled variation evoked by interactivity. Examples from experimental research illustrate this perspective. For instance, experimental research on video game violence (Sherry, 2001) can only achieve internal validity and generalizability if they can justify the claim that players in the "more violence" condition actually experienced (i.e., interactively produced) more violence than participants in the "less violence" condition. Because players can decide about their violent gaming behavior, experimental manipulation cannot fully determine the amount of violence players actually are confronted with or execute (Klimmt & Trepte, 2003). Some players in the "violent" condition may avoid so much of the combat action (by chance or because they enjoy playing this way) that the amount of violence they perceive and/or execute is more similar to the amount of violence researchers had envisioned for the "less violent" condition. To be generalizable to gamers and to other game situations that are not investigated, experiments must assure that specific structural features of game violence are used for experimental manipulation that rule out interactivity-based variations in the playing process because they may undermine the experimental design. Instead, game elements that re-occur in all or most game events are useful for such structurally powerful manipulations. An example for this would be a weapon used by players and that can be held constant across any conceivable action within the game and thus be manipulated successfully across experimental conditions (Barlett, Harris, &

Baldassaro, in press). For this research setting, it is worthwhile to consider which stimulus properties are invariant and not dependent on users' actions and, in turn, which game properties actually reflect interactive use. The technique we propose is thus to search for fixed "islands," structural media properties that are relevant to interactive communication but not object to interactive manipulation by users themselves.

The proposition to focus on invariant elements is as general as Shapiro's (2002) recommendation to look at the structural properties of the phenomenon. Results of a study that observes how constant or fixed elements of an interactive communication medium or process affect communication content or outcomes will achieve better generalizability, as they relate to underlying principles of interactive communication.

The following example shall further illustrate the proposed research strategy. An analysis of navigation patterns of the Web could compile patterns of the many different sequences of pages that research participants "surf." A substantial variety of navigation histories will be observed, as each participant will make highly individual, multistep navigation decisions. In terms of description of interactive media use, the observation of all these navigation paths would hold some merit, but its generalizability to "WWW use as such" is rather limited, for the study will only have collected a negligible fraction of all the potentially existing navigation behaviors in the real world. Thinking about how individual navigation behavior is bound to structural, constant features of the interactive communication situation, however, can improve generalizability, as these constant elements can be used to formulate predictions for Web behavior of people and/or in situations that have not been investigated directly. So researchers could illuminate the impact of web browser functions and hardware devices (e.g., mobile phone versus desktop PC) on individual navigation paths. The structural features set the boundaries in which interactive use can produce its many conceivable manifestations. Generalizable results would then refer to the contingencies between the constant features of Web use and actual navigation behavior. Thus, while a single study can't make predictions on individual web page sequencing (because there are so many other conceivable realizations of navigation behavior that may not be caught by the study), one can investigate the implications of structural features of interactive communication. On a more abstract level, this means that generalizability of research on interactive communication will grow if those features of the interactive medium are focused on that have relevance for the communication process under study, that is, social meaning (Shapiro, 2002).

Recording and Analysis of Manifest Communication Behavior

The third strategic option lies in the use of new media technologies for logging and/or recording ways of how media messages are produced or affected. The

idea is to gain more detailed information on communication process qualities in order to find out the boundaries of generalizability of one's study. For instance, in video game experiments, it is very useful to videotape the game session to measure ex-post the amount of violence executed by a player. Researchers can compensate for the loss of experimental control over the interactive communication setting by using the data gained from the recordings as quasi-experimental factors (Weber, Ritterfeld, & Mathiak, 2006). This way, validity *and* generalizability of the experiment can be improved. Detailed protocol data are useful in other research of interactive communication as well. For instance, studies on the correlations between frequency or persistence of interactive communication and certain outcome variables such as relationship quality (McKenna & Bargh, 1999) can achieve higher levels of generalizability if the actual communication contents (e.g., messages for different purposes such as self-presentation, uncertainty reduction) instead of mere data on frequency of interactive media use is recorded and analyzed. The relationship under study is thus defined more precisely, as the importance of *certain manifestations* of interactive media use (as measured through recordings or log files) for the outcome variables are the focus instead of measuring the mere frequency of interactive communication per se. By limiting the conceptual and empirical scope to smaller units of analysis, then, generalizability of findings can be improved. Compared to larger, more abstract levels of analysis (such as "intensity of using chats"), it is more likely that within smaller units of analysis, such as "frequency of certain interactive message contents," the great variability of interactive communication can be covered empirically, which would help to secure generalizability in the sense that the boundaries within which results should be generalized (i.e., only in respect to the investigated message content types) become more explicit.

CONCLUSION

We assume that there are more strategic options to work on generalizability of research on interactive communication than the three introduced here. Obviously, we do not propose or call for radical changes in methodological procedures, but rather we intend to direct researchers' attention to methodological and practical issues that distinguish interactive communication and conventional, linear mass communication. Because there are so many different interactive media, it is difficult to formulate general research strategies that will improve generalizability of research findings in every given case and area. Conducting research on interactive media will continue to require creative and innovative methodological procedures, especially for securing validity and generalizability.

As a consequence, researchers of new media should be inclined to discuss generalizability of their findings more explicitly for each single study. Relevant structural features of the examined communication as well as boundaries of generalizability (Shapiro, 2002) should be addressed in empirical research reports. This means that generalizability is also an issue of theory formulation and application. Concerning empirical procedures, it is reasonable to suggest that the operational descriptions in the Methods sections should include some lines on the implications of the implemented research design and measurement techniques for generalizability. The most important issue is, however, researchers' awareness of the peculiarities of interactive media, which need to be reflected in research design and reporting.

The challenges that interactivity imposes on generalizability should be responded to by changes to the scientific culture of replication. The relevance of single studies on interactive communication in terms of generalizability is limited, because one study can typically only assess a small fraction of the communication behaviors and patterns that exist in reality. Thus, replication and programmatic continuation of single studies become most important for more generalizable research on interactive communication. Especially useful are follow-up investigations that expand the scope of an original study, for instance, by targeting other samples and by looking at the importance of alternative constant elements of the interactive communication process. Such programmatic extensions would function as a search for the boundaries within which the original findings are generalizable (Shapiro, 2002) and help to achieve theoretical progress as well as a higher overall level of generalizability in research findings.

Given the career-relevance of unique, innovative research, substantial effort will be required to make the necessary replications and extensions more attractive to researchers. In addition to common sense about the desirability of replications, formal steps could include the foundation of a new (online) journal on "Replication in Communication" that may provide the platform to institutionalize repetition and replication, especially for studies of interactive communication.

The purpose of this paper is to emphasize that the ongoing debate on generalizability of communication research is fueled by the advent and dynamic development of interactivity and interactive media use. It was not our goal to question generalizability of past research on interactive communication but rather to contribute to the continuous methodological reflection on this topic. Clearly, generalizability is only one dimension of methodological reflection that has been neglected for reliability and validity discourses. Empirical communication researchers may use the opportunity to resolve two issues simultaneously when they think about both, the generalizability and its improvement in individual studies as well as in cross-study research agendas and when considering the implications of interactivity for the generalizability of their current work.

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